

CLAIMS

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1. A distillation apparatus characterized by comprising:

(a) a column body;

(b) a partition for dividing the interior of said column body into a first chamber and a second chamber, which are adjacent to each other;

(c) a feed nozzle for feeding into said column body a material liquid containing at least first to third components;

(d) a first distillation section comprising an enriching section located at an upper portion thereof and an exhaust section located at a lower portion thereof;

(e) a second distillation section disposed such that at least a portion thereof is adjacent to the top of said column body, and comprising an enriching section located at an upper portion thereof and an exhaust section located at a lower portion thereof;

(f) a third distillation section disposed such that at least a portion thereof is adjacent to the bottom of said column body, and comprising an enriching section located at an upper portion thereof and an exhaust section located at a lower portion thereof;

(g) first discharge means for discharging the first component;

(h) second discharge means for discharging the second component;

and

(i) third discharge means for discharging the third component, wherein

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(j) said partition is biased such that the cross-sectional area of the first chamber differs from that of the second chamber.

2. A distillation apparatus as described in claim 1, wherein said first distillation section is disposed at the center of said column body.

3. A distillation apparatus as described in claim 1, wherein said feed nozzle is adapted to feed the material liquid into the first distillation section.

4. A distillation apparatus as described in claim 1, wherein a packing is disposed in at least the enriching section and the exhaust section of said first distillation section such that the packing disposed in the enriching section and the packing disposed in the exhaust section are independent of each other.

5. A distillation apparatus as described in claim 1, wherein:

(a) said second distillation section comprises the enriching section connected to and formed above an upper end of said first distillation section; and the exhaust section formed below the upper end and located adjacent to the enriching section of said first distillation section while being separated by said partition; and

(b) said third distillation section comprises the enriching section connected to and formed above a lower end of said first

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distillation section, and located adjacent to the exhaust section of said first distillation section while being separated by said partition; and the exhaust section formed below the lower end.

6. A distillation apparatus as described in claim 3, wherein said feed nozzle is disposed between the enriching section and the exhaust section in said first distillation section.

7. A distillation apparatus as described in claim 4, wherein the packings are of the same kind.

8. A distillation apparatus as described in claim 4, wherein the packings are of different kinds.

9. A distillation apparatus characterized by comprising:

(a) a column body;

(b) a partition for dividing the interior of said column body into a first chamber and a second chamber, which are adjacent to each other;

(c) a feed nozzle for feeding into said column body a material liquid containing at least first to third components;

(d) a first distillation section comprising an enriching section located at an upper portion thereof and an exhaust section located at a lower portion thereof;

(e) a second distillation section disposed such that at least a

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portion thereof is adjacent to the top of said column body, and comprising an enriching section located at an upper portion thereof and an exhaust section located at a lower portion thereof;

(f) a third distillation section disposed such that at least a portion thereof is adjacent to the bottom of said column body, and comprising an enriching section located at an upper portion thereof and an exhaust section located at a lower portion thereof;

(g) first discharge means for discharging the first component;

(h) second discharge means for discharging the second component;

and

(i) third discharge means for discharging the third component,

wherein

(j) liquid descending from the enriching section of said second distillation section is distributed between the enriching section of said first distillation section and the exhaust section of said second distillation section at a distribution ratio which is predetermined on the basis of distillation conditions; and

(k) a pressure loss arising in said first distillation section is equalized with sum of a pressure loss arising in the exhaust section of said second distillation section and a pressure loss arising in the enriching section of said third distillation section.

10. A distillation apparatus as described in claim 9, wherein an F factor in at least said first distillation section, the exhaust section of said second distillation section, and the enriching section

of said third distillation section is set to a value that enables obtainment of a pressure loss almost free from influence of the amount of descending liquid. *not apparent*

11. A distillation apparatus as described in claim 9, wherein an F factor in at least said first distillation section, the exhaust section of said second distillation section, and the enriching section of said third distillation section is 1.0-1.5. *not apparent*

12. A distillation apparatus as described in claim 9, wherein the pressure losses are calculated on the basis of the number of theoretical stages, the number of theoretical stages per meter, and a pressure loss per unit height.

13. A distillation apparatus as described in claim 9, wherein the ratio between the cross-sectional area of said first distillation section and the cross-sectional area of the exhaust section of said second distillation section and the ratio between the cross-sectional area of said first distillation section and the cross-sectional area of the enriching section of said third distillation section are established according to the amount of ascending vapor. *not apparent -*

14. A distillation apparatus characterized by comprising:

(a) a column body;

(b) a partition for dividing the interior of said column body

into a plurality of chambers, which are adjacent to one another;

(c) a collector disposed within said column body and adapted to collect liquid descending from above; and

(d) a channel-type distributor for distributing liquid collected by said collector, among the chambers in different portions.

15. A distillation apparatus characterized by comprising:

(a) a column body;

(b) a partition for dividing the interior of said column body into a plurality of chambers, which are adjacent to one another;

(c) a collector disposed within said column body and adapted to collect liquid descending from above; and

(d) an open static-pressure-type tubular distributor for distributing liquid collected by said collector, among the chambers in different portions.

16. A distillation apparatus characterized by comprising:

(a) a column body;

(b) a partition for dividing the interior of said column body into a plurality of chambers, which are adjacent to one another;

(c) a collector disposed within said column body and adapted to collect liquid descending from above; and

(d) an open static-pressure-type tubular distributor for distributing liquid collected by said collector to a single chamber located therebelow, wherein

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(e) said distributor comprises an open static-pressure-type stand pipe for accumulating liquid discharged from said collector so as to establish a predetermined head; a first distribution section for distributing liquid in a direction perpendicular to said partition; and a second distribution section disposed in connection with the first distribution section and adapted to distribute liquid having been distributed by the first distribution section, in the same direction as that of said partition; and

(f) the first distribution section is connected to a lower end of the stand pipe at a position biased toward said partition from the center of the chamber.

17. A distillation apparatus characterized by comprising:

(a) a column body;

(b) a partition for dividing the interior of said column body into a plurality of chambers, which are adjacent to one another;

(c) a collector box for forming a liquid collection gutter along an inner wall of each of said column body and said partition; and

(d) a plurality of collector laminas disposed on said collector box at predetermined pitches in parallel with one another, wherein

(e) each of said collector laminas comprises an inclined portion and a gutter portion, and one end of the gutter portion faces the column body side of the liquid collection gutter while the other end of the gutter portion faces the partition side of the liquid collection gutter.

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18. A distillation apparatus characterized by comprising:

(a) a column body;

(b) a partition for dividing the interior of said column body into a plurality of chambers, which are adjacent to one another;

(c) a collector box for forming a liquid collection gutter along an inner wall of each of said column body and said partition; and

(d) a plurality of collector laminas disposed on said collector box at predetermined pitches in parallel with one another, wherein

(e) said collector box and said collector laminas are assembled in advance, and said collector box is engaged with said column body and said partition.

19. A distillation apparatus as described in claim 18, wherein:

(a) an upper end of said collector box is engaged with said column body and said partition; and

(b) a flange of said column body and said partition are sealed against each other by means of a gasket assuming a form corresponding to said column body and said partition.

20. A distillation method characterized by comprising the steps of:

(a) feeding a material liquid containing at least first to third components into a column body which comprises a first distillation section comprising an enriching section located at an upper portion

thereof and an exhaust section located at a lower portion thereof; a second distillation section disposed such that at least a portion thereof is adjacent to the top of the column body, and comprising an enriching section located at an upper portion thereof and an exhaust section located at a lower portion thereof; a third distillation section disposed such that at least a portion thereof is adjacent to the bottom of the column body, and comprising an enriching section located at an upper portion thereof and an exhaust section located at a lower portion thereof; and a partition which is disposed in a biased manner so as to render the cross-sectional area of a first chamber different from that of a second chamber;

(b) condensing vapor containing a predetermined component, by means of a condenser connected to an upper end of the second distillation section;

(c) evaporating liquid containing a predetermined component, by means of an evaporator connected to a lower end of the third distillation section; and

(d) obtaining liquid rich in the first component at the upper end of the second distillation section; liquid rich in the third component at the lower end of the third distillation section; and liquid rich in the second component at a section where the partition is disposed.

21. A distillation method as described in claim 19, wherein the first component is lower in boiling point than the second component,

which in turn is lower in boiling point than the third component.

Translation of the amended page of Amendment under Article
Claim 21 was amended.

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(b) condensing vapor containing a predetermined component, by means of a condenser connected to an upper end of the second distillation section;

(c) evaporating liquid containing a predetermined component, by means of an evaporator connected to a lower end of the third distillation section; and

(d) obtaining liquid rich in the first component at the upper end of the second distillation section; liquid rich in the third component at the lower end of the third distillation section; and liquid rich in the second component at a section where the partition is disposed.

21. (amended) A distillation method as described in claim 20, wherein the first component is lower in boiling point than the second component, which in turn is lower in boiling point than the third component.

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